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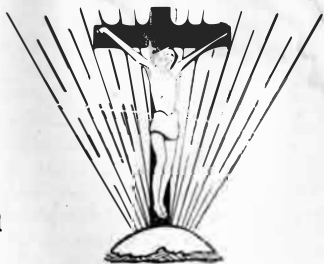
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THE MEDICAL ASPECTS OF THE CRUCIFIXION OF OUR LORD JESUS CHRIST

From a Study of the Shroud of Turin

Robert Bucklin, M.D., F.A.C.P.



TO A physician, a study of the Passion and death of Christ presents an intriguing consideration. Unfortunately, relatively few individuals with a medical background have undertaken this investigation.

A detailed review of the situation and events leading to the Passion and death of Christ are not within the scope of this paper. However, it is necessary that a certain amount of background material be presented for general orientation. To one entering upon this field of research, it is vitally important that there be careful separation of what is fact from what is fancy or fiction. There are many positive facts about the Crucifixion which are well documented. The date, for example, has been established beyond reasonable doubt to have been April 7, 30 A.D. The site of the Crucifixion was the hill named Golgotha, a short distance from the north wall of the city of Jerusalem. Through a study of the New Testament and with the aid of archeological revelation, it is possible to trace the footsteps of Christ with a high degree of accu-

racy for the last few hours of His life.

After the establishment of the Holy Eucharist with the disciples at the Cenacle on Thursday evening, Christ and some of His disciples left the city and proceeded in a northeasterly direction to the Garden of Gethsemane, passing through the old Fountain Gate in the south end of the city and walking along the Valley of the Cedron. It was in the Garden that the Passion really began, and here it is that Christ suffered the bloody sweat. Such a phenomenon is exceedingly rare but is explained by hemorrhages into the sweat glands occurring at this time, as the result of a highly emotional state. The amount of blood lost is, of course, unknown, but it can probably be assumed on the basis of events which followed that the amount was small. No comment is made in the Scripture about there being saturation of garments.

Before the party left the Garden of Olives to proceed back to Jerusalem, Christ was arrested by the soldiers of the high priest and taken to the courtyard of the home

of Caiphas, which was located in the southwest portion of Jerusalem, not far from the Cenacle. Here it is that the trial took place during which time Christ was subjected to a number of indignities, including blows about His face. Since the Sanhedrin, the Jewish governing body, did not have the authority to put the death sentence into effect, it was necessary that Christ be taken to the court of Pontius Pilate, the Roman governor, in order that the death sentence be confirmed. Pilate held court at the Antonia which was a fortress-like structure at the north end of the Jewish temple.

The events which transpired as the result of orders by Pilate are well documented in the Gospels. These included the scourging and the crowning with thorns. At one time, either as the result of an attempt at courtesy or one of derision, Christ was taken to the palace of Herod Antipas at the request of Pilate. Christ refused to answer any of Herod's questions and was promptly returned to the Antonia. The death sentence having been confirmed, crucifixion was ordered, and the Victim was given a portion of His cross to carry. The distance actually traversed by Christ with His cross was approximately 600 yards. During that distance, tradition tells us of several falls, and as a result bruises and abrasions were sustained in various portions of the body. The time consumed by the transporting of the cross to Calvary was probably fairly short. Since crucifixion was a common method of carrying out the death penalty, it can be

assumed that the soldiers who performed the nailing and suspension of the Victim onto the cross were experienced in their duties, and that this portion of the process was done quickly.

Scripture tells us that Christ was suspended on the cross for approximately three hours, and that He expired at about 3 o'clock in the afternoon. There is reason to believe that death occurred more quickly than might have been expected. The statements of Pilate would support this contention, when he was asked by the disciples for permission to remove the body from the cross. Probably not much thought had been given to what was to be done with the body after removal from the cross, until the actual time of death. Since the following day was the Sabbath and in this particular year was also the Passover, it was a day which was doubly holy, and according to the Jewish law no work was permitted on that day. The burial of a body was considered as labor. The Sabbath officially began at sundown on Friday, so that it was necessary for any burial procedure to be completed prior to that time.

Because of the short period, it was not possible for the disciples to perform the usual burial ritual which included anointing the body carefully with warm scented water and oils before placing it in the sepulchre. All that there was time to do was to wrap the body quickly in the long linen cloth which was brought to the scene by Joseph of Arimathea and to place within the folds of the cloth and on the body a mixture of aloes and

myrrh to serve as a preservative. St. John states in his Gospel that approximately sixty-five pounds of this preservative were used. The body was laid upon the cloth in a linear fashion, and the cloth was folded over the front portion of the body. The arms were placed over the chest, rigor mortis having been broken in order to accomplish this. A narrow band was placed around the chin and over the top of the head in order to keep the jaw in place. The body was then transported a short distance to the sepulchre. Whether the sepulchre was actually a cave-like structure or whether it was a shallow grave is not known. Most evidence, however, points to the fact that it was in the form of a small chamber slightly over 2 meters in its largest dimension.

The body lay in the sepulchre for an unknown period of time and was gone from the place early on Sunday morning when the burial party returned. At that time only the wrapping cloths were found in the sepulchre. The long linen cloth in which the body was wrapped has been preserved through the centuries, and it is this cloth which is known today as the "Shroud of Turin." Its history is colorful and has been traced in detail by a number of European authors. On occasion it has been damaged by fire, and visible on it are several paired patches, put on to cover holes burned in the cloth. There is no serious question about its authenticity. The Shroud is preserved at the present time in the Cathedral in Turin, Italy. The cloth is remarkable because on it there is im-

printed an image of a human body showing both frontal and dorsal views. Present also on the cloth are blood stains, marks left by fire, and some large water stains. Photographs of the cloth were taken in 1898 by Secondo Pia and in 1931 by Guiseppie Enrie. The photographs of Enrie are remarkable in their clarity, and it is a study of these photographs, including life-sized enlargements, which are the basis for the medical study of the events of the crucifixion.

A consideration of the medical phases of the crucifixion properly begins with a careful examination of the frontal and dorsal imprints appearing on the Shroud of Turin. The cause of these imprints has been examined by a number of investigators, and it can only be stated that at the present time there is no clear explanation for their presence. The imprints outline the body of an adult male, seventy-one inches in height and weighing an estimated one-hundred and seventy-five pounds. The stiffness of the extremities in their imprints is strongly suggestive that rigor mortis had taken place. On the image there are evidences of a number of injuries. Each of these injuries has produced a characteristic imprint. Those which reflect abrasions and contusions have left imprints which are characteristic of this type of injury. Those which have resulted from the outflow of blood from large cavities have left their imprints in an equally characteristic fashion. This is particularly true of a large imprint of blood appearing on the frontal image of

the chest. It is immediately apparent to the investigator that the image on the Shroud is in effect a mirror image with right and left reversed. This is easily explained by the position of the cloth above and below the body during its tenure in the sepulchre.

The injuries to the body can be well divided into five groups: the marks of the scourge; the nail imprints in the wrists; the nail marks in the feet; the wounds on the head, and the wound in the chest. The marks of the scourge appear on the front and back of the body and are most notable over the back. Here they extend from the shoulders down as far as the calves of the legs. On the front of the body they also appear on the chest and legs, but there is no evidence of marks of the scourge appearing on the arms or forearms. From this fact it may be assumed that the arms were elevated over the head at the time of the scourging. The scourging was done as a preliminary to the crucifixion, and we are told by historians that it was a common event. The implement used was a whip-like structure called a *flagrum*. It consisted of two or three thongs, at the ends of which were tied small bits of either bone or metal. The implement was applied to the body in such a way as to produce bleeding by the metal or bone tearing the skin. The marks, as they appear on the Shroud image, clearly define the shape of the tip of the *flagrum*. It is notable that the imprints of the scourge appear in a sheaf-like fashion directed downward and medially from the shoulders. Their appearance would

serve to indicate that there were either two persons doing the scourging or that one scourger changed his position from the right to the left side. The number of scourge marks is particularly interesting. It was the Jewish law that the scourging would be limited to forty blows, and, as a matter of habit, the limit was practically set at thirty-nine. Scourging under the Roman law, as occurred in the case of Christ, was unlimited in its extent. Those who have counted the scourge-mark images on the Shroud have variously estimated them as up to or more than one-hundred.

From an examination of the imprint of the back, it may be possible to draw some conclusions as to the structure and manner of carrying the cross. Most of our religious paintings and pictures show Christ carrying His entire cross, supported over one shoulder. It is highly improbable that such was the actual situation. In the first place, if the cross were made according to what we are told was the manner of the times, it would have been an extremely heavy structure, variously estimated to have weighed nearly three-hundred pounds. It is highly improbable that anyone could have carried this weight even for six-hundred yards. As a matter of fact, since crucifixion was a common method of putting victims to death, the upright portion of the cross, known as the *stipes*, was permanently in place at the point of execution. It was a long beam firmly embedded in the ground and extending up for about eight feet. The crossbar or *patibulum* was the

portion carried by the victim. The weight of the crosspiece is unknown but has been estimated to weigh as much as eighty pounds. The manner in which the *patibulum* was supported on the body appears fairly definite by examination of the imprints on the back of the image. Had the crossbar been carried over one shoulder, it could reasonably be expected that it would have produced a large bruise on the shoulder. Since all the other bruises suffered by Christ during His passion have appeared so distinctly on the Shroud image, one wonders why there is no evidence of a bruise on the shoulder. However, examination of the back in the region of the *scapulae* shows two large areas of bruising. These might have been produced by the crossbar being supported over the upper portion of the back rather than being balanced on one shoulder. A weight thus supported is actually easier to carry, since its weight is divided over a large area. Another explanation for these bruises might be the writhing of the victim while suspended on the cross.

Examination of imprints left by the hands and arms of Our Lord provides a great deal of information, and here again it becomes immediately apparent that the position of the nails as ordinarily depicted is subject to some question. The hands, as they appear on the imprint, show the marks of four fingers well. There is, however, no evidence of imprints left by the thumbs. The hands are crossed, with the left hand appearing on top of the right and cover-

ing the right wrist. In the region of the left wrist, there is a blood-stain which represents the mark left by the nail. That this mark is not in the palm is easily ascertained by simple measurements taken from the site of the mark to the tips of the fingers. It becomes readily obvious that the mark is not in the center of the palm, but in the wrist. The mark left by the nail in the right wrist is covered by the left hand.

The careful experiments of Dr. Pierre Barbet in Paris have served to prove without doubt that a nail passed directly through the palm could not support a body weighing 175 pounds. There is insufficient tissue between the metacarpal bones of the palm to adequately support a nail, and, as Barbet was able to prove, the nail would quickly tear through the soft tissues and skin and fail to support the body. A nail, however, placed through the carpal bones and supported by the bones and by the ligaments of the wrist was proved adequate to sustain the weight of a body satisfactorily. There are some who feel that the nail was placed higher than the wrist, between the radius and ulna. It is true that such a placing would be done easily, but it also appears that there is insufficient space between the radius and ulna near the wrist to allow a nail to enter. The position of the nail still remains a point of minor controversy, although the great weight of evidence indicates that it was placed through the carpal bones, which it separated but did not fracture. The blood-stain on the left wrist is composed of two

projecting stains which are separated from one another by approximately a 10 degree angle. This angulation is an evidence of the fact that the body while suspended on the cross assumed two different positions in such a way that the blood running from the nail hole in the wrist proceeded in two slightly divergent streams. This fact is further supported by examination and measurement of the angles of flow of the blood streams on the forearms. Each of these blood streams on the image appears to extend almost horizontally. If one were able to extend the arms laterally until the blood streams appear vertical, it would be found that they are extended in a position approximately 65 degrees from the horizontal.

From the positions of the streams of blood both on the wrist and on the forearm, it is obvious that there must have been some other support for the body besides the nails in the wrists. The author was privileged to observe the suspension of a human on a cross in the studio of Reverend Peter Weyland, S.V.D. and also to suspend himself for a brief period of time under the direction of Father Weyland. The pain suffered by a suspension by the wrists alone is all but unbearable, with the tensions and strains being directed to the deltoid and pectoral muscles. These muscles promptly assume a state of spasm, and the victim so suspended is physically unable to make use of his thoracic muscles of respiration. However, as soon as a support is provided for the feet, the suspended victim is im-

mediately able to relieve the strain on his wrists and to direct his weight toward his feet. By so doing, he elevates his body to a slight degree by extension of his legs. This change in position is of approximately 10 degrees and readily accounts for the divergence in the streams of blood as they pass down the wrists and forearm on the Shroud image. The fact that on the imprint of the hand no thumb is visible is explained by the fact that the nail passing through the bones of the wrist either penetrated or stimulated the median nerve. The motor function of the median nerve is flexion of the thumb; the thumb being flexed over the palm remained in that position after rigor mortis was established and for that reason does not appear on the hand imprint. Some slight suggestion of the pain suffered by a suspended victim with a nail through or near his median nerve is possible when one realizes that the median nerve is a sensory as well as a motor nerve.

A study of the imprints of the feet is somewhat less complicated than the study of those of the arms and hands. On the Shroud there are two prints representing the marks left by blood-covered feet. One of these, the mark of the right foot, is a nearly complete footprint on which the imprint of the heel and the toes can be seen clearly. In the center of this is a square mark surrounded by a pale halo and representing the position of the nail in the foot. The imprint made by the left foot is considerably less clear and does not in any way resemble a footprint. Examination

of the calves of the legs on the dorsal view shows that the right calf has left a well-defined imprint on which the marks of the scourge can be well seen. The imprint of the left calf is considerably less distinct, and this, coupled with the fact that the left heel is elevated above the right heel, leads to the conclusion that there is some degree of flexion of the left leg at the knee, and that the occurrence of rigor mortis has left the leg in this position. It appears, then, that the right foot was directly against the wood of the cross, and that the left leg was flexed slightly at the knee and the foot rotated so that the left foot rested on the instep of the right foot. By this position, the blood on the soles is accounted for readily. A single nail was then used to fix both feet in position. Whether or not there was any other support for the feet than the wood of the cross has been a matter of some conjecture, and up to the present time the point cannot be settled. The reason for the nailing of the feet was twofold: the simplest reason was to prevent the victim from flaying his legs about, but the second reason was more *thoughtful* and was based upon the fact that a victim supported only by his wrists was unable to survive for more than a very short period of time; by having some kind of foot support, he was able to alternate his position so that his agony could be prolonged for a much greater period of time. This fact becomes obvious when one positions himself on a cross suspended by his wrists alone.

The marks on the head constitute the third group of injuries.

On the front of the face, in the forehead, there are several blood prints. One of these has assumed the appearance of a figure 3. On the back of the head, circling the scalp, is a similar row of blood prints. These were obviously left by the crown of thorns. High on the scalp are similar blood stains which can be explained if one assumes that the crown of thorns, instead of a circlet, was shaped more like a cap and that there were branches and thorns laced over the top of the cap. We are told that the thorns were approximately one inch in length. Passing through the skin and subcutaneous tissues of the scalp, they lacerated vessels and, as is well known of scalp injuries, there was a considerable amount of bleeding because of the retraction of the torn vessels. On the face, corresponding to the right cheek, there is a swelling of the malar region. This has resulted in partial closure of the right eye. Presumably this injury occurred during the time of the trial in the courtyard of Caiphas, when it is recorded that Christ was struck in the face by one of the soldiers. There is a very slight deviation of the nose, and some who have examined this image have stated that there is a fracture of the nasal cartilage. At the tip of the nose there is a bruise which probably occurred during one of the falls while carrying the cross. A small moustache is readily visible on the upper lip, and covering the chin is a short beard which is divided into two portions. The straightness of the sides of the face and the short separation of the locks of hair from the face are

readily accounted for by a chin band which was placed around the jaw and over the top of the head.

The last of the major wounds on the body of Christ is that in the side. It is obvious that this wound, which was made by the lance after the death of our Lord, is on the right side. It is partly obliterated by one of the several patches on the cloth, but its imprint is still clear. This imprint of blood shows the effects of gravity and actual drips and droplets of blood are clearly seen. There is also evidence of separation of clot from serum. At this point, and also more clearly seen on the dorsal imprint near the lower portion of the back, there is evidence of another fluid which has been mingled with blood. Recalling the words of the Gospel of St. John, we are told that after the lance pierced the side of Christ, there was an outflow of blood and water. It appears that the source of the blood cannot be seriously questioned. It must have come from the heart, and from the position of the blood imprint as well as its structure it can be assumed that this blood came from the right side of the heart. This chamber was dilated after death and when pierced by the lance, the blood readily flowed from it. A considerable portion of the blood must have dripped onto the ground, but enough was left to form a large stain on the chest and to be later transferred to the Shroud. The source of the water described by John presents more controversy. The theory presented by Dr. Barbet was that the fluid represented

pericardial fluid. However, the amount of pericardial fluid normally present is in the nature of 20 to 30 cubic centimeters, too small an amount to be seen by the naked eye as it came out of the wound in the side with the blood from the heart.

Dr. A. F. Sava has presented a challenging theory that there was a hydrohemothorax caused by the trauma to the chest by the scoring and increased by the position of the body on the cross prior to death. Dr. Sava suggests that there was a separation of the blood and the watery fluid after death and the lance piercing the side released first the blood and then the clear fluid. It would appear that perhaps the combination of the theories of Barbet and Sava might explain the situation. An accumulation of fluid in the pleural space without hemorrhage is a logical conclusion as the result of congestive heart failure related to the position of the Victim on the cross. It is quite possible that there was a considerable amount of fluid so accumulated, enough so that when the lance pierced the side that fluid would be clearly seen. I feel that an actual puncture of the heart must be accepted as factual, particularly in view of recent statements by Pope Pius XII. If the theory of pleural effusion plus puncture of the right side of the heart were sustained, it would be expected that the water would have been visible from the side before the blood and that John's words would have appeared as "water and blood" rather than "blood and water." As a matter

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of interest, the words appear in the former sequence in several of the early Greek translations of the New Testament. This point is still in controversy and may be settled by experiments which are currently being performed. When the body was removed from the cross and placed in a horizontal position, there was a second large outflow of blood from the wound in the side. Much of this must have fallen onto the ground, but some stayed on the body and flowed around the right side, leaving a large imprint of clot and serum in the lumbar area. It is in this imprint where the mixture of the blood and the watery fluid is best seen and its presence on the back lends further support to the theory that there was a pleural effusion rather than the water having come from the pericardial sac.

In this presentation, I have made

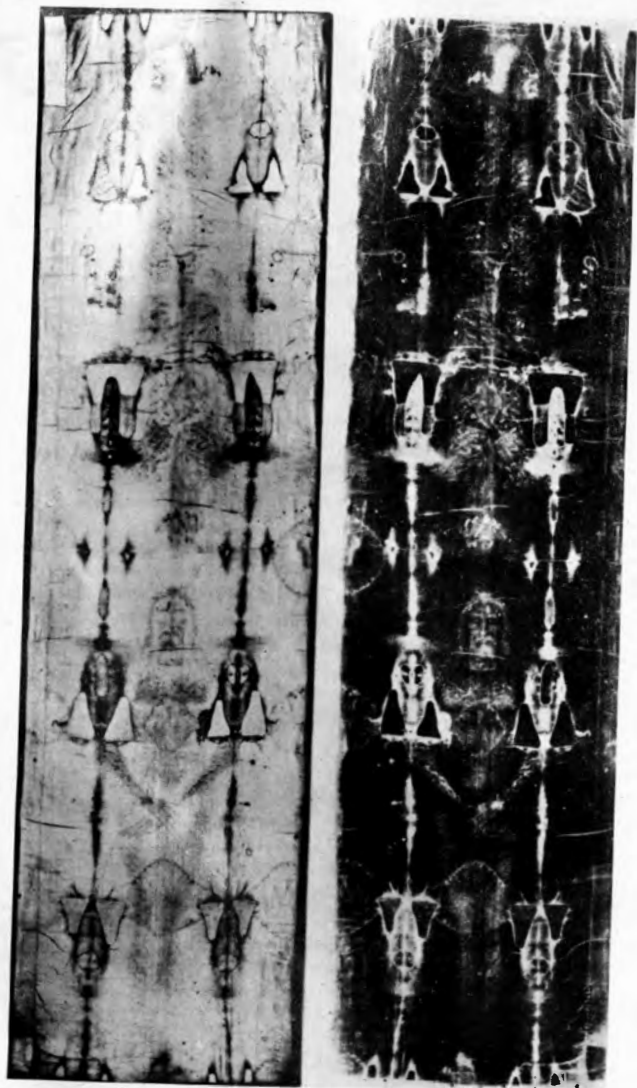
an attempt to explain all of the marks as they appear on the Shroud of Turin. I make no claim for originality except in certain minor details. I am indebted to the many authors whose works will stand as monuments to their interest and efforts. These include Pierre Barbet, M.D.; Rev. Werner Bulst, S.J.; Rev. Francis Filas, S.J.; Rev. Adam J. Otterbein, C.S.S.R.; Anthony Sava, M.D.; Paul Vignon; Rev. Peter Weyland, S.V.D.; Rev. Edward Wuenschel, C.S.S.R., and others.

I have made no effort to comment upon the spiritual benefits of such a study. However, those who choose to look at the subject from that point of view will find much material for worthwhile meditation.

Dr. Bucklin is pathologist and Director of Laboratories, Saginaw General Hospital, Saginaw, Mich.

The Catholic Physician, does not have any special medical knowledge because he is a Catholic, but he does have a point of view from which to consider the problems of his profession. Therefore, he should try to exert a positive influence on his environment, especially when he works in non-Catholic surroundings.

Pope Pius XII. Radio message to the Seventh International Congress of Catholic Doctors, the Hague, September, 1956



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THE SHROUD OF TURIN

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